

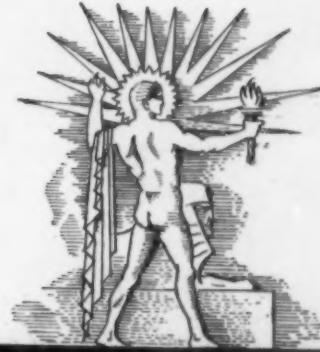
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



SEPTEMBER 19, 1931

Poised, Ready to Whirl Away

See Page 182

A

SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XX

No. 545

The Weekly
Summary of
**Current
Science**



Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Science, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

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DO YOU KNOW THAT

Less than a century ago, in 1860, only three per cent. of the people of the United States lived in cities.

Japan averages four earthquakes a day, but gets a serious shock only about once in seven years.

A new method of picking fruit is to shake the ripe fruit from the tree and then to gather it from the ground with a suction machine.

Manganese is used in making window glass because it successfully fades out the brown tint caused by iron in the glass, leaving the glass clear white.

In one factory where electric clocks are made a stethoscope is used in detecting whether a timepiece is defective.

An organ with a bronze keyboard and silver pipes was found not long ago at the site of the Roman city Aquincum, and is believed to date from the third century B. C.

In the State of Washington, bull frogs are classed as "fur-bearing animals" in order that people may farm frogs under existing laws governing fur-farmers.

According to the 1930 census, there are 1,942 persons in the United States who are both blind and deaf.

Time lost in New York City because of traffic delays has been estimated at a money value of a million dollars a day; Philadelphia loses about \$400,000.

The world's largest snake is the reticulated python, found in the East Indies.

Painting inexpensive furniture to imitate the grain of costly woods was an old trick in ancient Egypt.

A Swedish statistician reports that the first year of married life is not so critical as popular tradition would have it, but that the time when marriages are likely to go on the rocks is during the fifth to the tenth years of wedded life.

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Science Service presents over the radio, an address

CROPS AND CIVILIZATIONS

By Dr. E. D. Merrill, Director-in-Chief of the New York Botanical Garden,

Friday, September 25, at 2:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

ASTRONOMY

Evidence Obtained that Space Between Stars Not Transparent

Absorption of Stellar Light by Matter May Make Stellar Distances Seem too Great, Says Astronomer

FROM A STUDY of far-away nebulae, some of the most distant objects that can be observed by astronomers, Prof. Edwin F. Carpenter, of the Steward Observatory of the University of Arizona, has obtained new and additional evidence that space between the stars is not entirely transparent.

Speaking before the meeting of the American Astronomical Society, in session at the Perkins Observatory of Ohio Wesleyan University, Prof. Carpenter told of his latest researches. Previously Dr. R. J. Trumpler, of the Lick Observatory, and Dr. Piet Van de Kamp, of the McCormick Observatory, found indications that part of a star's light may be absorbed during its journey through space.

The Milky Way system, or the Galaxy, includes the sun and all the stars that we can see. It is shaped like a grindstone, and we are not far from the center. As we look towards the edge of the grindstone, we see the stars more concentrated toward the sides, and this causes the Milky Way, which is shown by even a small telescope, to consist of myriads of stars. Beyond the limits of our Galaxy, however, are other similar systems, the so-called "extra-galactic nebulae," and these are what Prof. Carpenter has studied.

Would Afford Check

Dr. Trumpler's researches upon the absorption of light in the inter-stellar space led him to suppose that through the middle of our Galaxy there extends a layer of material that stops a portion of star light passing through it. Prof. Carpenter decided that the extra-galactic nebulae would afford a check upon such a theory as this.

When we look at these nebulae beyond the sides of the grindstone, their brilliancy would be scarcely affected, because their light would have to penetrate but a very small thickness of the absorbing cloud. No such nebulae can be seen in the actual direction of the Milky Way, but those near it would seem somewhat dimmed, because their

light would have to come through a considerable amount of the absorbing stuff. In a similar way, the sun appears fainter at sunset. The earth's atmosphere is the absorbing cloud. When the sun is close to the horizon its light has to penetrate much more atmosphere than at noon, and so it does not look as bright.

Prof. Carpenter found that the extra-galactic nebulae do show this effect. With measures of the diameters of these nebulae made by Dr. E. P. Hubble at Mt. Wilson Observatory, and of their total brightness by a European astronomer named Holetschek, he computed their apparent surface brightness. It was found that a nebula of a given size near the Milky Way is fainter than one of the same size in the part of the sky farthest from the Milky Way, the galactic poles.

"At 20 degrees from the Milky Way," said Prof. Carpenter, "where we should be looking through some three or four times as much material as there is in the direction of the galactic poles, the brightness decreases by nearly 40 per cent."

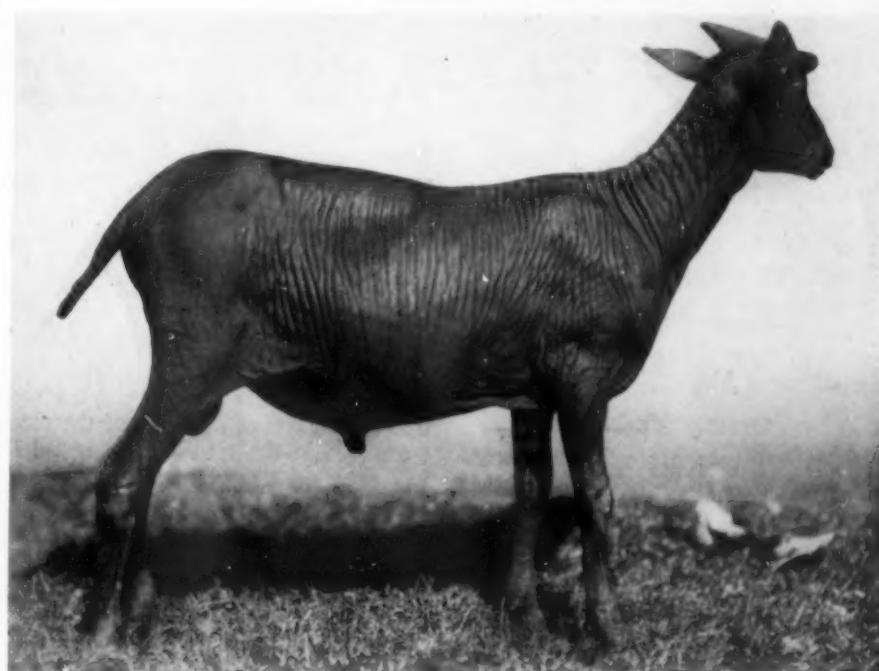
If such a layer of absorbing matter exists, it means that previous measures of distances in the direction of the Milky Way are much too great. Prof. Carpenter explained the reason. "When we know a star's actual candle-power," he said, "we use its apparent faintness as a measure of its distance, but if a part of the faintness must be attributed to the dimming cloud, the star's real distance must be less than formerly supposed."

Science News Letter, September 19, 1931

ENGINEERING

New Photo Tube Measures Temperature in Furnace

A NEW "photo tube" which looks into a furnace and measures the heat, has been described by Dr. L. R. Koller of Schenectady, N. Y. A current is set up in the tube by the light it "sees." The brightness of an object varies sixteen times as fast as its temperature; therefore the photo tube current



BAREBACK

Journal of Heredity

This wool-less sheep from Russia represents an interesting twist of heredity. Many mammals have hairlessness in their hereditary equipment—generally as a recessive character. That is, it is frequently overshadowed by the stronger "dominant" tendency to grow hair and only makes itself known in that small percentage of cases when it is inherited from both parents.

is a very sensitive means of measuring temperature.

The new pyrometer can measure temperatures as low as 1,000 degrees Centigrade, and has no upper limit, Dr. Koller said. It is instantaneous, and is not injured by the furnace or its contents. This is a very needful apparatus in these times of high temperatures in modern industrial processes. Lack of adequate means of measuring high temperatures in furnaces has handicapped their use.

Science News Letter, September 19, 1931

PHYSIOLOGY

Accepted Theory of Sense Of Balance May be Revised

THE GENERALLY accepted theory of how the sense of balance operates may have to be revised as a result of research reported by Dr. Franklin Fearing of Northwestern University.

Dr. Fearing has made a study of the behavior of birds after certain operations had been performed on the inner ear. Previous to the operation, the birds had been trained to follow a simple maze which required them to hop, perch, walk up an inclined plane, and to do other stunts that would show up any disturbance in their ability to maintain their equilibrium.

The birds showed no serious disturbances after the removal of from two to four centimeters of one of the semi-circular canals, although any flow of fluid through that part of the canal was then impossible. Such a flow has been supposed to produce the feeling of equilibrium or lack of it. On the other hand, removal of a single ampulla, the enlargement at the end of the canal, produced disturbances in the balancing behavior of the birds. The nature of these disturbances differed in the different birds.

Greatly Variable

"Contrary to the classical and contemporary reports of the results of this type of investigation, there is enormous variability both as to type and severity of the symptoms following surgical interference with the canals, but there appears to be but little constancy as to the time of appearance of the symptoms and the rate of recovery of the bird," Dr. Fearing reported. He added that there was evidence that the function became completely restored even in the case of birds showing the most severe type of symptoms.

Science News Letter, September 19, 1931



LARGEST OF HIS TIME

Such was the distinction of the Uintatherium, with three pairs of horns, that lived in North America 35,000,000 years ago. In great contrast are the tiny four-toed primitive horses which were about the size of a collie dog. They are known as Orohippus. This restoration of prehistoric life is a mural painting by Charles R. Knight, now on exhibition at Field Museum of Natural History, Chicago. It is one in a series of twenty-eight presented by Ernest R. Graham.

PHYSICS

New Method Measures Speed Of Electrons in Dense Solids

A METHOD used by astronomers to determine the velocity of stars has been applied in a slightly modified form to the atom to furnish the first direct evidence that electrons, negatively charged electrical portions of atoms, move about at high speeds within bodies which are solid.

The experiment, conducted at the California Institute of Technology by Dr. Jesse W. M. DuMond, research fellow, and Dr. Harry A. Kirkpatrick, teaching fellow in physics, was the second crucial test of activities of the electrons within the atom. The first test was reported last January.

In explaining the application of the Doppler effect to the experiment, Dr. DuMond declared that if the source of the light or sound is in motion the successive vibrating waves or ripples are crowded together on the forward side of the motion's direction, and spaced farther apart on the rearward side.

A similar phenomenon explains the fact that the sound from a train whistle approaching a stationary listener is of higher pitch than the sound of the same whistle when the train is receding from

the listener. In the same way, stars approaching an observer emit spectral lines shifted toward the violet end of the spectrum, whereas receding stars emit lines shifted toward the red.

When the electron scatters X-radiation a similar effect occurs. If that part of the radiation which is scattered at a definite angle to the incoming beam is observed with a spectroscope, the spectral line which was in the original radiation is found to be shifted toward longer wave-lengths and the spectral line is found to be broadened. The shift may be regarded analogically as a Doppler effect caused by the velocity of the electron recoiling away from the light under the impact that the light has given it. The increased breadth of the line may be regarded as a composite Doppler effect of the chaotic motion of all the electrons in the myriads of atoms scattering the X-radiation. Dr. DuMond set the average speed of the invisible electrons which make up solid matter at 1,500 miles per second for the case of carbon.

Science News Letter, September 19, 1931

PHYSIOLOGY

Activity of Pituitary Gland Basis of Test for Pregnancy

Discovery that Excess Amount of Hormone Passes Into Blood Shortly After Conception May Save Lives in Future

THE FACT that the pituitary gland empties an excessive amount of its hormone into the blood within a few days after conception is the basis for a test for pregnancy which has recently been proved accurate by the following investigators: Dr. M. H. Friedman of the University of Pennsylvania, Dr. H. L. Reinhart and Dr. Ernest Scott of Ohio State University; Dr. P. F. Schneider of Northwestern University; and Dr. T. B. Magath and Dr. L. M. Randall of The Mayo Clinic.

The test, known as the Aschheim-Zondek test because it was devised by Dr. S. Aschheim and Dr. B. Zondek, of Germany, is of extreme medical importance and may be a life-saving measure for the patient.

More Than Body Needs

With the overproduction that is characteristic of natural processes having to do with reproduction, more of the pituitary gland's hormone is made at the time than the body needs. All of it is carried about the body in the blood stream and as the blood passes through the kidneys the excess amount of the hormone is filtered out and passes from the body in the secretion of the kidneys. If some of this secretion is injected into non-pregnant female experimental animals, a detectable change in the ovaries of the animals takes place.

There are some diseases which may make women incapable of standing the added strain of pregnancy. If, in such a case, there is a possibility that conception has taken place, it is of first importance that the fact be known as soon as possible. The Aschheim-Zondek test gives this information earlier than any other method.

The test is also valuable for distinguishing at an early stage between pregnancy and tumors or growths which may be dangerous and require immediate removal.

There are a number of other uses of the test which, conscientiously applied, rob the function of reproduction, which occupies so essential a place in our lives, of some of its dangers.

This search for a test of pregnancy has continued for 4,000 years. Drs. Aschheim and Zondek discovered a curious record of a pregnancy test in an Egyptian papyrus.

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HYGIENE

Industrial Hygiene Urged To Lengthen Adult Life

EFFORTS to add years to the span of life of the adult population require the aid of industrial hygiene and medicine, it appears from a report by Dr. R. L. Thompson, U. S. Public Health Service, to the American Public Health Association.

So far, the span of life has been increased in childhood, but the adult life span has not grown much longer. This is because the efforts of preventive medicine and public health have been

MATHEMATICS

Famous Old Theorem Solved After Lapse of 300 Years

THE proof to one of the world's most famous unproved theorems has just been announced at the recent meeting of the American Mathematical Association. Prof. H. S. Vandiver of the University of Texas has an answer which the world's best brains have tried to get for almost three hundred years.

In the middle of the seventeenth century Pierre de Fermat casually jotted down on the margin of a book he was reading, that it was impossible to find three integers such that if two of them were raised to an integral power larger than two and added, then the sum would be the third integer raised to that very same power.

The case of course is not true when two is the power, and three, four, and five, the other integers. Three squared is nine, four squared sixteen, and their

largely directed toward those diseases of infancy and childhood.

In order to lengthen the adult's span of life, the problem must first be attacked in those groups having excessive and unnecessarily high rates of sickness and death, such as workers in hazardous occupations, Dr. Thompson pointed out.

Comparison of the death rates for the industrial population with those for the general population gives every justification for the expenditure of time and money in the field of industrial hygiene and medicine, Dr. Thompson stated. He described the changes in this field since the time, only fifteen years ago, when the industrial physician was called "finger wrapper."

Both employers and employees have now an entirely different attitude toward the industrial physician. The physical examination is no longer used by industry to exclude workers, but to fit them to the right occupation and to watch the effect of the occupation on their health. Medical schools also have recognized the importance of this field of medicine and all of them now include some instruction in it, while some schools of public health offer complete courses for the industrial physician, and engineer.

"There is no other field which offers greater opportunities," was the conclusion reached by Dr. Thompson.

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sum twenty-five. This sum is equal also to the square of five.

What has challenged mathematicians ever since, is the fact that Fermat wrote in addition, that he had a simple, elegant proof, but that it was too long to put down on the margin. He died and left no solution.

Most mathematicians have at one time or another tried their hand at it. It was proved true in certain special instances, but never as a general case. At the same time, however, no one ever proved it was not true.

Prof. Vandiver's calculations have now shown that the theorem is true whenever the product of the three integers has no factor in common with the power integer.

Science News Letter, September 19, 1931

BOTANY

Orchids That Look Like Girls

Flower Forms Suggest Doves, Swans, and Even Elephants To Folk Who Keep Their Imaginations Young and Active

By FRANK THONE

WHEN a smitten night-club Johnny bestows a gift of orchids upon the exotic lady of his preference, and pens on his accompanying card something about "Orchids for an Orchid Girl," he may be dealing out better botany than he realizes.

For if there are dancing girls who look like orchids, at least to an enamored eye, there are also orchids that look like dancing girls to anybody's eye.

Plucked from their stems and stood on the table, they are the daintiest little dancers imaginable—dancers in the latest fashionable costumes at that. Their skirts are long and concealing, tight over the slim hips and flaring widely at the bottom. The dancers stand poised, their arms thrown up and out, their heads covered with chic cloche of a rather theatrical pattern, such as one would expect show-girls to wear. One involuntarily waits for them to break their fragile repose at any moment and whirl into their dance.

But they are orchids, just orchids. They come from Panama, and the botanists at the Missouri Botanical Garden in St. Louis have been very successful in their culture. For official purposes they refer to them by their severe family name of *Oncidium stipitatum*, but most of the time they call them Dancing Girls, as everybody else does. For botanists are human beings, who smoke pipes and go around in their shirt-sleeves, and they can see a pretty girl just as far as anyone can.

Orchids can look like dancing girls, or a variety of other things, because they are such highly specialized flowers. They have evolved one of the most astonishing methods of transferring pollen from one flower to another known in the whole plant kingdom, and in doing so have developed their petals and sepals into all sorts of unusual and beautiful forms. It is all done to attract big bees and moths, and even humming birds, and to maneuver them into just the right position for receiving and carrying the masses of pollen

which must be transferred if the species is to survive; but incidentally the orchids make themselves into things of beauty and joys forever—especially to the florists who reap the golden harvests from expensive feminine tastes.

This bizarre evolution of the floral parts in orchids, undreamed of by such severely regular cousins of theirs as lilies and tulips, expresses itself in the Dancing Girl mainly in the development of her spreading skirt. This is a single petal, grown to be the largest and showiest part of the whole flower. Her two upflung arms are the two other petals, which have remained more nearly like those of "orthodox" flowers. Her hood-like cap is a structure that protects the pollen-bearing and seed-forming parts of the flower. All round, the Dancing Girl is a hard-working little lady, with a serious purpose in life, though her festive garb may not tell everybody about it.

Picture of a Swan

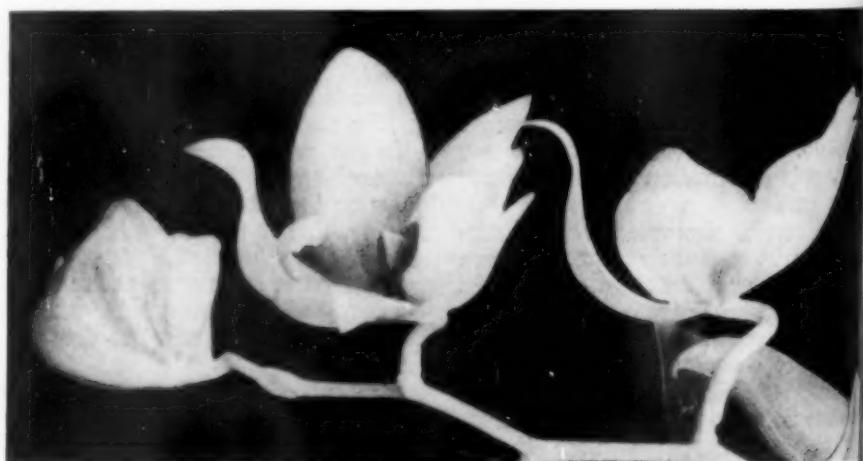
But orchids can depict other things besides graceful girls. Another species forms the image of the most graceful of birds, the white swan. Even its Greek name, *Cynoches*, means "swan's neck"; and although this refers to one of the inner parts of the flower, the whole blossom exteriorly is a lovely picture of a swan.

As might be expected of the swans of fairyland, these flower-birds have no sense of responsibility to gravitation. Those on the underside of the drooping stem are as unruffled as their sisters on the upper side, and the ones that must perch stand out sidewise care nothing for that. These swans of phantasy calmly regard all such matters as merely relative, and pay them no attention.

Even more lovely than the swan orchid is the dove orchid. This exquisite flower is a native of Panama and other Central American states, and also does well in the orchid houses at St. Louis and in other botanical centers. In this orchid the outer flower parts, the petals and sepals, are more orthodox in shape and form a sort of frame or shrine around the exquisite little image at the center.

This is made up of the structures associated with the sending and receiving of pollen; it is the very heart of the life-activity of the flower. And it has the form of a dove brooding over its nest. In every opened flower the lovely image is repeated, like a poem or a passage of music that one does not tire of hearing again and again. It is not at all to be wondered at that the people of the countries whence it comes, strongly imbued as they are with the Latin tradition, should have called this orchid "the flower of the Holy Ghost."

Much humbler in its pretensions is an orchid genus native to our own northern woods. In this flower the lower petal, that spreads out into the skirt of the Dancing Girl orchid, is modified into a hollow, slipper-shaped



SWANS SWIMMING MOTIONLESS IN AIR



LIKE A PRIMA DONNA WITH HER SUPPORTING CAST: DANCING-GIRL ORCHIDS

sac, while three other parts of the flower, narrow and twisted, flare outward at the top like loose tiestrings. The resemblance of this flower to a slipper is so irresistible that it has entered into its name in all lands. The Indians called it moccasin-flower, and in Europe it got the name of lady's slipper. Its botanical name is *Cypripedium*, which means "slipper of Venus"—Cyprus was one of the numerous alternative titles of the classical goddess of love.

The Slipper of Venus

The lady's slipper genus is a large one, and though most of its members are content with the conventional foot-wear pattern some of them branch out a bit. One of the species has earned for itself the Latin surname *Papilio*, or butterfly, because the flower-parts that form the "strings" of the commoner slipper types are here so long and slender that they look like the antennae of an insect.

Another *Cypripedium* of more sinister entomological mimicry is described in one of the most curious books about flowers that was ever written. Erasmus Darwin, grandfather of the famous Charles Darwin and his forerunner in evolutionary speculation, wrote a book of highly fanciful verse called "The Botanic Garden." Published when the eighteenth century still had ten years more to live, it combines the sentimentality of the early Romantic school of literature with the stiff elegance of form insisted upon by the Classicists. It is a long allegory, in which flowers are persons, and have the same standing with nymphs, gnomes and a host of other mythological folk conjured up by the old dilettant-naturalist whose more prosaic grandson was to set the scientific and philosophic world by the ears.

This flower that Erasmus Darwin tells about he had never seen, for he

says as much in a footnote, and inserts as an illustration a picture of an ordinary North American lady's-slipper. But this hearsay *Cypripedium*, described as looking like a fat-bodied, long-limbed tropical spider that frightens off visiting humming-birds, moved the elder Darwin to a flight with the Muse.

But orchids are not by any means the only flowers that make imaginative mortals see insects, animals, birds and even inanimate objects in their curious adaptations of sepals, petals and stamens. Folk-names and botany-books alike erect monuments to such resemblances.

Every flower of the pea family is a butterfly to the botanist, for he knows that particular flower-form as "papilionate"; and that, in plain Saxon, means "like a butterfly." But if he pulls a pea-flower to pieces he sees different things in its separate petals. The broad, flat one at the top they call the "banner," the two at the sides are the "wings," and the two narrow ones folded edge to edge at the bottom form the "keel." The butterfly has become a festive flying boat.

And again, among the flowers less showy than the orchids, the spider as well as the butterfly finds its mimics. All over the country, in moist places, grows the tall, grass-leaved, blue-flowered plant known as the spiderwort. This time it is not the flowers themselves that earn the name, but the clustering collar of leaves that jut out from the stem just below the flowers, bearing at least a slight resemblance to the legs of a spider.

Much more realistic is the mimicry of a certain narrow-petaled member of the amaryllis tribe that is very common in the South, always growing with its feet in the water. The perianth-parts of this flower are so exceedingly slender, and its stamens so conspicuous, that its

common name of "spider lily" is inevitable.

Human resemblances are not lacking, either. Everybody sees faces in the common pansies of our dooryards, though some prefer to call them monkey-faces rather than reflections of their own. There is another genus of flowers, with only one species common in the East but highly deployed in the West, that bears the appropriate name of "monkey-flower." The eastern species is especially well marked. Under each of its violet-to-white hoods is a little grinning face, so pert and impudent that when you are shown it for the first time you cannot help laughing.

Botanists no less than everyday folk have seen the joke in the monkey-flower. The great Linnaeus had a good imagination, and many of his Latin names are most poetically pat. This plant he called *Mimulus ringens*, which means "a grinning little mimic." Several of the western species of *Mimulus* have become garden favorites, because of their bright color—they favor the red-yellow end of the spectrum—and the fact that they can be grown very successfully in wet places. There is one species in Yellowstone National Park that might almost be called the "geyser flower," it is found so often keeping its toes warm in the run-off springs of the hot springs and geysers.

A Sylvan Preacher

If you get to talking about human resemblances in flower, no child will let you leave the subject without doing justice to the Jack-in-the-pulpit. Here it is the whole flower-structure, rather than just the flower itself, that supplies the image. And to tell the truth, the image of the pulpit is much better than the picture of the preacher, if you look too closely. However, it is sufficient to satisfy the fancy of childhood. (Please turn to page 191)

PHYSICS

Silk Belt Gathers Huge Electric Charge

CHARGES of electricity in 10,000-volt groups are carried up a moving endless silk belt until they have accumulated a potential of 1,500,000 volts on two-foot copper spheres, in a new type of apparatus for exploring the heart of matter which was reported to the American Physical Society by Robert J. Van De Graaff, National Research Fellow, Princeton University.

While potentials of more than a million volts have been built up in the past by different kinds of generators, the construction of this apparatus is unique.

"The generator has the basic advantage of supplying a direct, steady potential," Dr. Van De Graaff said, "thus eliminating certain difficulties inherent in the application of non-steady high potentials. It is simple, inexpensive and portable. An ordinary lamp socket furnishes the only power needed."

Two hollow copper spheres, each 24 inches in diameter, mounted on seven-foot glass rods, accumulate the high tension charges of electricity in each of two identical units, one unit accumulating positive electricity and the other negative. In each unit an endless silk belt runs between a pulley near the ground end of the glass rod and a wheel in the sphere.

"The ascending surface of the belt is charged near the lower pulley by a brush discharge," Dr. Van De Graaff explained. "The charge is maintained by a 10,000-volt transformer kenotron set, and is subsequently discharged by points inside the sphere."

Science News Letter, September 19, 1931

CHEMISTRY

Decay of Algae Increases Manganese in Water Supply

DECLAY OF ALGAE, which are low forms of water plants, together with decomposition of other organic material, is responsible for increased concentration of the mineral manganese in some drinking waters. The acidity of the water examined was found to be increased by the decomposed matter, and to this acidity was due the dissolving of the manganese.

This discovery was made by Edward S. Hopkins and George B. McCall, who made a careful study of the water sup-

ply of Baltimore. Samples of water from the 23,000,000,000-gallon reservoir were taken weekly for about two years. The bottom of the water contained the manganese, and with the seasonal turnover was brought to the top to be used in the city's supply.

For the past few years it had been noted that this supply underwent an increase in manganese, beginning in late October and continuing until January of each year. This was the manganese which went into the solution during the summer season. Heretofore, the mystery of the manganese in the water supply had defied satisfactory explanation.

Science News Letter, September 19, 1931

MATHEMATICS

New Way to Solve Equations in Physics

A NEW METHOD of solving integral equations has been announced by Prof. R. E. Langer, and Dr. M. L. Hartung, of the University of Wisconsin. These equations play fundamental roles in the physical theories of heat, sound, light, and electricity. They have been used in the recent revolutionary theories of physics and in the biological theories of heredity. They have played a dominant role in checking the "normal frequency law" which is the basis of most statistical theory and practice today. Within the last five years it has been shown that a dynamical theory of economics cannot be developed without these equations.

Science News Letter, September 19, 1931

ORNITHOLOGY

Birds Fly at High Speeds Timing by Airplane Shows

GEESE pursued in an airplane on four different occasions flew from 52 to 56 miles per hour, it has been revealed. In a Scottish estuary ducks were chased in the air going at a speed of 46 miles per hour.

Teal were found to be fast fliers. Lieutenant R. W. Wicks of the Royal Navy, who observed bird speeds, pursued them. He was flying 75 miles an hour when they were a quarter of a mile away, and it took him some minutes to catch up.

Grouse over a moor at Perthshire had a top speed of 58 miles an hour. Snipe do not let themselves be paced. The quarry makes a couple of turns and vanishes completely.

Science News Letter, September 19, 1931

IN SCIENCE

PHYSIOLOGY

Hens Fed with Vitamins Lay Vitamin-Rich Eggs

ONE WAY of getting plenty of the rickets-preventing vitamin D in your eggs is to feed lots of it to the hens that lay them. Experiments indicating this were performed by Francis G. McDonald and O. N. Massengale.

They fed pullets a diet containing codliver oil for eight weeks, and then tried oil from their egg yolks on rats. Afterwards they gave the same pullets a course of feeding on irradiated ergosterol of 10,000 times the strength of the codliver oil, and again fed oil from their egg yolks to rats. They found that the egg yolk oil after the highly concentrated ergosterol feeding was 185 times as effective in preventing rickets as was the yolk oil after the codliver oil feeding.

Science News Letter, September 19, 1931

PSYCHOLOGY

Person Who Relaxes May Be Able to Do Most Work

THE MAN who can "take it easy" while he works may get the most done, it is indicated in a report by Dr. G. L. Freeman of Yale University.

Dr. Freeman has studied the relation between muscular tension accompanying mental effort, the quality and quantity of work done, and various incentives to work. He found that with very simple tasks such as moving a finger back and forth, the output increased in proportion to the amount of muscular tension. But with more complicated tasks, such tension may be a hindrance.

When the subjects of the experiment competed for a money prize, this incentive affected both the muscular tension and the output. Discouragement lowered tension and output; over-encouragement increased tension but decreased accuracy, Dr. Freeman reported. Knowledge that the task required was difficult increased the tension, but also increased the accuracy of the performance.

Science News Letter, September 19, 1931

NCE FIELDS

MATHEMATICS

Mathematics Named as Outstanding Business Need

MORE THOROUGH mathematics, more honest mathematics, is one of the outstanding needs of business at the present time. Without better mathematics than now goes toward the making of statistical economic forecasts, there cannot be any hope of making such forecasts really mean anything.

Thus, in brief, declared Prof. Harry C. Carver of the University of Michigan, in a report to the American Mathematical Association. Prof. Carver said, in part:

"It is greatly to be regretted that that phase of business statistics dealing with the analysis and projection of time series rests on an exceedingly unstable foundation. There is absolutely no excuse for this state of affairs. For the most part this work is being done by economists and 'professional forecasters' who are far more interested in making predictions than they are in estimating the probability that the actual occurrences will differ from their forecasts by more than a specified per cent

"I believe that by the time the mathematicians realize the importance of this branch of applied mathematics, the business world will be insisting on a better cooperation of mathematics and economics, and forecasting will have ceased to be a racket."

Science News Letter, September 19, 1931

PSYCHOLOGY

Baby Chimpanzee Superior To Human Infant in Tests

A FEMALE baby chimpanzee, whose development from its very beginning has been known and watched by scientists, has been brought up in the laboratories of comparative psychobiology at Yale University under conditions similar to those of a bottle-fed human infant. Throughout its life it has been carefully measured and watched, and it has been given the same mental and physical tests that are given in the

psychological laboratories at Yale to human babies.

The results of these tests have been described by Carlyle Jacobsen and Joseph Yoshioka of Yale.

The rate of physical development was found to be much greater for the chimpanzee than for the human infants during the first six months of life, but the chimpanzee's growth slowed down during the second half year. The chimpanzee doubled her birth weight in three months, trebled it in six months. At six and one-half months she had all her milk teeth except the canines.

On tests of motor behavior she showed more rapid development than the human infants up to the eighteen-month tests. She was also superior, although less pronouncedly so, on the tests of adaptive and personal-social behavior up to the twelve-month tests. The order in which the different achievements became possible for her was the same as for the human babies.

Science News Letter, September 19, 1931

PUBLIC HEALTH

Cancer Deaths Increase Greatly During 1931

A N UNUSUALLY large increase in the number of cancer deaths for the first six months of 1931 is reported by the Metropolitan Life Insurance Co. A rise from 77 deaths per 100,000 population in the first half of 1930 to over 83 per 100,000 in the corresponding period of 1931 is the largest increase in deaths from this cause ever recorded for a one-year period, the company's statisticians state.

While these figures apply only to the industrial policy-holders of the company, there is indication that the records for the rest of the population will show a similar large increase in numbers of cancer deaths during the year. However, in one section of the United States, the Far West, the cancer death rate has actually declined this year, the company's records show.

The influenza epidemic may have contributed to the increase in cancer deaths during the first three months of the year, as deaths from all chronic diseases are usually more numerous during influenza outbreaks, the report explained. The increase in cancer deaths during the second quarter of 1931 cannot be explained on the same grounds, however, for the influenza outbreak was well over by that time.

Science News Letter, September 19, 1931

MEDICINE

U. S. May Become Immune To Infantile Paralysis

A POSSIBLE favorable result of outbreaks of infantile paralysis such as the present one may be the conferring on the population of the country an immunity to the disease and ability to resist its attacks, it appears from a discussion of the disease by Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research, in a recent issue of *Science*.

"There are strong reasons for believing that a gradual immunization of the population of the United States is taking place as a result of the epidemics of infantile paralysis which have prevailed in different parts of the country since the large Swedish-Norwegian outbreak of 1905," Dr. Flexner declared.

"An attack of infantile paralysis is protective for life, irrespective of the intensity of the attack," Dr. Flexner explained. "Persons who have had infantile paralysis possess in their blood certain protective or healing substances which can be used effectively to treat persons sick of the disease, and perhaps to prevent the disease in other and exposed children."

"Not only are the protective and curative properties present in the blood of persons who have recovered from obvious attacks of infantile paralysis; they are present also in some amount in the blood of many adult persons who have never suffered from the disease."

Science News Letter, September 19, 1931

ARCHAEOLOGY

Sacred Spring Among Finds in Indian Village

A SACRED spring, timbered and cribbed with cedar logs in ancient times, and at the bottom of which were ten pottery pieces and more than forty prayer-sticks, was found by Dr. Paul S. Martin, leader of the Field Museum Archaeological Expedition to the Southwest, at Ackman, Colorado.

The prayer-sticks were very similar to those used by Hopi Indians, and pottery types were unlike anything in the neighborhood, belonging apparently to the Chaco style hundreds of miles away in New Mexico. A trench made through a kiva or temple shows walls and floors whose character was found to be most puzzling.

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BEFORE AND AFTER

At right is a Mayan priest, in full regalia, standing before a row of cowering prisoners. The carving came from the ruined Mayan city, Yaxchilan, in southern Mexico, and illustrates conventional Mayan art, elaborate, detailed and stereotyped. The picture on the left is taken from a battle scene painted on the wall of the Temple of the Warriors. A Mayan fighter is on the roof of a temple helping defend his village from attacks by raiders below. This is some of the simple and lively art which followed a waning of religious domination in the city of Chichen Itza.

ARCHAEOLOGY

Life Injected Into Ancient Mayan Art—Politics the Cause

Study of Reconstructed Temple Shows That Real Heroes Replaced Stereotyped Portraits After Mass Revolt

CENTURIES ago in the city of Chichen Itza, in Yucatan, Mayan Indians who were the hard working masses of the city's population escaped from under the thumb of their powerful rulers. Somehow, no one knows how it happened, the common people grew strong enough to pit their will against the priest-kings who ruled them. They pushed, and authority gave way, a little at least. For the first time in their history, perhaps, the masses had a taste of political and religious liberty, after centuries of living, working and worshiping exactly in accordance with their overlords' commands.

Evidence of such a dramatic turn in prehistoric American politics is found in the paintings that adorn the great Warriors' Temple in Chichen Itza, according to latest archaeological interpretation. Not a bit of the struggle is actually told in any of the pictures. But the story of the rise of the masses in prehistoric Chichen Itza has been read "between the brush strokes" of the ancient paintings by Earl H. Morris, archaeologist, of the Carnegie Institution of Washington.

The Temple of the Warriors is almost "home" to Mr. Morris. For four winters, he and Mrs. Morris and other members

of the Carnegie Institution expedition staff worked at the ruins of Chichen Itza to restore the Warriors' Temple to some of its oldtime grandeur. At first, the temple was a rocky tree-covered hill from which carved stones protruded, but now it is a building so beautiful that some critics call it the most magnificent example of Mayan architecture known.

As a final task, before the Temple of the Warriors could be considered a finished archaeological project, Mr. Morris and his associates have prepared a full report of their work. This report in two monumental volumes has been published by the Carnegie Institution.

In it, Mr. Morris draws for the first time his conclusions as to why Mayan paintings and bas reliefs in this temple are so different from the sort of art that has come to be famous as the conventional Mayan art style.

Little Chance to be Original

Conservative, old-fashioned Mayan art was as religious as European art of the Middle Ages. It depicted formal priests offering sacrifices at altars, Mayan deities in highly impersonal, artistic attitudes, and religious symbols conventionalized beyond recognition. It was very beautiful art, because of the skill of the stone carvers and stucco workers, who wrought the religious pictures in the form of bas reliefs against temple walls. It conformed so closely to the style established among the Mayas as good and correct, that an artist had little chance to try anything original.

But here in the Warriors' Temple are painted murals which show, not the orthodox priests posed by altars, but everyday Mayan people rowing canoes, carrying burdens, cooking, fighting off enemies in a raid. The people in these pictures are "doing," rather than merely "being." This is the distinction drawn between the new art and the old.

In the portraits of warriors which adorn the pillars of the temple, Mr. Morris sees real Mayan heroes, with personalities and individual character traits, in place of the old style stock portraits of gods and heroes with stereotyped Mayan features.

Science News Letter, September 19, 1931

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MEDICINE

Contagion of Typhoid Fever

"A Classic of Science"

In 1839 Dr. Budd Solved the Mystery of Typhoid Fever By Mapping the Spread of an Epidemic from Case to Case

ON INTESTINAL FEVER: ITS MODE OF PROPAGATION. By William Budd, M. D. In *The Lancet*, London, Dec. 27, 1856.

THERE are few things in which the people of this country have a deeper concern than in knowing the real truth in what relates to the mode in which this fatal disorder is disseminated amongst them. Every year, on an average, some twenty thousand British souls perish miserably by it, and disasters, which, occurring in the army of the Crimea, made the nation shudder, occur annually in the peaceful, working, army at home, without giving the nation a thought. As for one who dies of this fever there is reason to believe five or six recover, some 100,000 or more of our people must every year pass through its protracted miseries. The real amount of human suffering involved in this is, however, but feebly represented by mere arithmetic. No one can know what these figures really imply who has not had experience of this disorder in his own home. The dreary and painful night-watches, the unusual length of the period over which the anxiety is protracted, the long suspense between hope and fear, and the large proportion of cases in which hope is disappointed and the worst fear is at last realized, make up a sum of distress that is happily scarcely to be found again in the history of any other acute disorder. Even in the highest class of society the introduction of this fever into the family is an event that, in most cases, long stands out in relief in the record of family afflictions. But if this be true in the houses of the rich who have every means of alleviation which wealth can command, how much more true must it be in the cottages of the poor, who have scant provision even for the necessities of life, and none for its great emergencies? Here, when fever once enters, want soon follows, and contagion is not slow to add its peculiar bitterness to the

trial. As the disease is by far most fatal to persons in the prime of life, the father or mother, or both, are the first to perish when death ensues, and the young survivors being left without support, their home is broken up, and their destitution becomes complete. How often have I not seen in past days, in the single narrow chamber of the workman's cottage, the father lying in the coffin, the mother in the sick bed in muttering delirium, and nothing to relieve the desolation of the children but the devotion of some poor neighbor, who too often paid the penalty of her kindness in becoming herself a victim of the same disorder. In its ordinary course human life has few such consummations of misery as this. It is impossible to contemplate events such as these merely as objects of science. It is, indeed, a fundamental axiom in scientific investigation, that our emotions should be rigidly excluded from it. But although by the nature of things they cannot help in the solution of a problem, they may at least be suffered to give a spur to inquiry. Where the interests concerned are the sacred and unspeakable interests of life and death,

this is their proper function, and that in a degree of which none of the common alternatives which hang upon human duty can give any real measure. It were well for us all if they were often allowed to have their true weight with the conscience. Having been by accident thrown much in the way of this fever, I have long felt that it is impossible to bear a part in the calamities of which it is the source, without becoming possessed by a burning desire to devote the best powers of the mind to discover means, if such there should haply be, by which such calamities may be prevented. From the fact already referred to, of its being so much more deadly to grown-up persons, this disease has a relation to pauperism which is peculiar to itself. In this fever the workhouse finds its chief purveyor.

5634 Deaths

"From returns made in 1838 by the medical officers of twenty unions and parishes in the metropolis, it appeared that 13,972 cases of claims to relief, on the ground of destitution, were created during that year by attacks of fever alone; and that in 1281 cases the attacks proved fatal. The general deaths from fever in the metropolis during that year appear, from the summary of the Superintendent Registrar's returns, to have been 5634."—(Letter from the

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Louis Agassiz

because he grew up among the glaciers of Switzerland, he knew the signs of ancient ice sheets which formerly covered Europe. His description of the great

Ice Age

is the subject of
THE NEXT CLASSIC OF SCIENCE

Poor-law Commissioners to the Metropolitan Board of Guardians, Nov. 1840.

One of the most interesting of the many writers who have dwelt on this point expresses himself in the following words:—

"A fever which consigns thousands to the grave consigns tens of thousands to a worse fate, for fever cuts off the parents, leaving the wretched offspring to fill the future ranks of prostitution, mendicancy, and crime."

It is humiliating to think that issues such as these should be contingent on the powers of an agent so low in the scale of created things, that the mildew which springs up on decaying wood must be considered high in comparison. To know how these powers take effect, in what way they grow to such a height, and to learn therefrom, perchance, by what means their operation may be defeated, are problems in which human happiness is deeply interested. Perhaps there are few battles to be fought in which a successful issue depends so closely as here on a real knowledge of the enemy. If it be true of disease in general that all prevention must be based on an intimate acquaintance with their causes, it is still more true of that great group of diseases which are the work of definite and specific agents, having not only the power of subsisting within the body, but capable, for limited periods at least, of existing externally to it. For it is clear that in such a case a thing against which we may be powerless, so long as it infects the body itself, may present, on its issue from the body, the conditions of an easy conquest.

That the specific form of fever which is attended with a specific disease of the intestinal follicles is a true member of this group may be very easily proved.

In saying, in the number of *The Lancet* for December 6th, that this fever is a contagious fever, I was well aware that I was making an assertion to which

the great weight of medical opinion in this country is directly opposed. Not to speak of minor notabilities, the whole prestige of the Board of Health, and of the London Royal College of Physicians, may be cited against it. To make unceasing and implacable war against contagion and contagionists seemed with the former, indeed, to be, for some years, the chief purpose of its existence. And although many important changes have lately occurred in its staff, there is still abundant evidence that in dealing with this and kindred questions this Board is unable to shake off its old traditions . . .

Site of the Epidemic

Seventeen years ago, while engaged in country practice in Devonshire, outbreaks of this species of fever repeatedly fell under my eye, under conditions singularly favourable for the study of its mode of propagation. Of these outbreaks, the most memorable occurred in the village of North Tawton, in which I then lived. In addition to the advantages enjoyed by country practitioners generally, in the observation of such events, there were others peculiar to the position I then occupied. Having been born and brought up in

the village, I was personally acquainted with every inhabitant of it; and being, as a medical practitioner, in almost exclusive possession of the field, nearly everyone who fell ill, not only in the village itself, but over a large area around it, came immediately under my care. For tracing the part of personal intercourse in propagating disease, better outlook has rarely fallen to the lot of an observer.

At the date of the outbreak in question, the people of the place numbered some 1300 souls. Of these a small minority, consisting chiefly of women and children, worked in a serge factory; the rest were employed in agricultural pursuits. The spot on which this community dwelt is richly endowed with all the natural conditions of health. Built on a dry soil, in the midst of an open and well-drained country, and occupying the side of a hill sloping gently to the northwest, this village had been long and justly noted in that part of Devon, for the rare healthiness of its site. What is more to the present purpose is, that it had for many years enjoyed an almost entire immunity from the fever to which it was so soon to pay so large a tribute. This is the more to be remarked, because there were, in

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the economy of the place, and in the habits of the people, many things which, according to modern views, are hard to reconcile with such a fact. In the first place there was no general system of sewers. A few houses, occupied by the more opulent, were provided with covered drains, but all these might be counted on the fingers. In the cottages of the men who earned their bread with their hands, and who formed the great bulk of the inhabitants, there was nothing to separate from the open air the offensive matters which collect around human habitations. Each cottage or group of three or four cottages had its common privy, to which a simple excavation in the ground or an open ditch at hand served as the cesspool. Beside this it was a part of the economy of all who worked in the fields, as indeed of many more, to keep a pig, one of whose functions was to furnish manure for the little plot of potatoes, which fed man and pig alike. Thus, hard by the cottage door, there was often not only an open privy but a dungheap also.*

No Fever

Nevertheless, these things existed for many years without leading to any of the results which it is the fashion to ascribe to them. Much there was, as I can myself testify, that was offensive to the nose, but fever there was none. It could not be said that the atmospheric conditions were wanting, because while this village remained exempt, many neighboring villages had more than once suffered severely from the pest. It could not be said that there were no subjects, for these, as the sequel proved, but too much abounded. Meanwhile, privies and dungheaps continued to exhale ill odours without any specific effect on the public health. Many generations of swine innocently yielded up their lives, but no fever of this or any other sort could be laid to their charge. I ascertained by an inquiry conducted with the most scrupulous care that for fifteen years there had been no severe outbreak of the disorder, and that for nearly ten there had been but a single case. For the development of this fever a more specific element was needed than either the swine, the dungheaps, or the privies, were, in the common course of

*I am happy to say that since the date referred to, a great reform has taken place in many of these things. The town is now drained by a system of well-constructed sewers, and pure water, conveyed in closed pipes from an abundant source about a mile distant, is laid on under high pressure through every part of it. So that, in respect of sanitary conditions, North Tawton is now quite a model of a place. The swine, I am told, remain unmolested.

PSYCHOLOGY

Gasp is Not Usual Response Of Persons Scared by Snake

Blood Pressure Increased and Breathing Rate Changed In Shocking Situation, Psychologists are Informed

A GASP of surprise is not the manner in which a person responds to the sight of a live snake even if it is over six feet in length, Dr. Harold B. Gaskill, of Iowa State College, told the psychologists gathered at Toronto for the recent meeting of the American Psychological Association.

The rate of breathing, however, in such a shocking situation is changed, he stated. Half the persons whom Dr. Gaskill tested breathed much faster than before they received the shock, but with the others the breathing was slowed to an equally conspicuous extent. Blood pressure increases during fear. Heart rate was sometimes increased and sometimes decreased, but half of those tested showed no change.

Dr. Gaskill also found that reading a short story slows both breathing and heart rates.

The curves of the body of a graceful diver resemble mathematically those of an airplane wing, Dr. Coleman R. Griffith of the University of Illinois reported. As the body is curved at the top of the dive, seemingly poised for a fraction of an instant in air, the mathematical formula for the pattern of the human form is very much like that of a wing designed for a slow-moving airplane. When the body straightens out for entrance into the water, the pattern is like that of a high-speed wing.

By the aid of motion pictures of high dives, aerial casting from trapezes, and backward handsprings, Dr. Griffith has studied the differences between the movements of graceful, highly skilled

things, able to furnish. In the course of time—as was, indeed, sure to happen—this element was at length added, and it was then found that the conditions which had been without power to generate fever, had but too great power in promoting its spread, when once the germ of fever had been introduced. The soil was already prepared; it only required the seed to bring forth the bitter fruit.

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performers, awkward beginners, and persons under the influence of fear. The angles between different parts of the body in the skilled performer change smoothly with the movement. Awkwardness causes too much change in the angles. Fear, because of the accompanying muscular tension, too little.

The saying "there is no accounting for tastes" is disproved by research reported by Dr. Paul T. Young, of the University of Illinois, who has found that food preferences and aversions of experimental animals follow certain definite laws. He is now attempting to find out what these laws are. All the rats studied showed practically the same preferences. Milk stood highest in the list of foods chosen, while flour was the last choice. Some of the foods are chosen to almost the same extent, and in this case the order of preference may shift suddenly. Thus, butter may be preferred to ground wheat one day and the ground wheat chosen the next. But neither is preferred when sugar or fresh milk is available. Rats fed on a diet including cod liver oil tend to place butter toward the bottom of the preferential list.

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ORNITHOLOGY

Deserted Island is Set Aside as Bird Refuge

ST. KILDA, one of the loneliest islands in the world, has been purchased and set aside as a bird refuge, now that its human inhabitants have left. The island lies off the Northwest coast of Scotland.

Until last year it was occupied by a few families, who lived under conditions of the greatest hardship, and were practically cut off from the world most of the year. They were removed to the mainland, where living conditions are a little better, and their old home left only to the great flocks of birds that had shared it with them.

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METEOROLOGY

Irregular Rainfall on Barren Plains Cause of China Floods

AS ONE of the great rivers, on rampage again, brings watery death and destruction to the heart of the world's most thickly populated country, drowning thousands and sending thousands more to the tops of the city walls for safety, people wonder why China has so many and such disastrous floods.

Irregular and abnormal rainfall descending on arid plains barren of vegetation that would stay the rush of the water to the sea is, in brief, the answer of authorities in geography of the U. S. Department of Commerce. Data there show the extreme variability of these rains. The Hupei area at the beginning of the fabled Yangtze river gorges is an example. In 1897 rainfall of 10.6 inches was recorded for May. For the same month in 1900 the rainfall was reduced to a meager 1.9 inches. In June of 1897 it totaled 2.5 inches, then in July mounted to 16.6 inches, and by August and September fell back to 8 inches or less. July, 1924, holds the heavy precipitation record for that month, with 19.8 inches of rain.

Greater in Summer

The rains in China are always greater in summer than winter, and during a normal year at the city of Hankow, the focus of this year's disaster, there is a 40-foot difference in the river's level for these seasons.

Centuries of intense cultivation in China have stripped the land of vegetation. Everything raised must be edible. When the rains fall there is no spongy green carpet to absorb them, and they rush on to swell the Yangtze and its tributaries. From out of the gorges, walled high on each side, comes this chief artery of vast China, and as soon as the broad alluvial plains are reached the tremendous force of the caged torrent takes effect and the Yangtze spreads out over the country in one muddy blanket.

Attempts have been made by the weary Chinese peasant to build strong dykes to reinforce the river's natural levees. He pays a tax for that purpose. But something usually happens to the tax, and so for seven years the Yangtze dykes have gone unrepaired.

The river deposits material along its edges each time it overflows. In consequence, the Yangtze has built itself up until in some sections its bed is actually higher than the surrounding plain. Masses of Chinese live in this flood plain below the river to take advantage of the rich, black soil. And when the monsoon speaks they answer—usually with their lives.

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ASTRONOMY

Astronomer Disputes Theory That Universe is Exploding

EXPLANATIONS based on Einstein's relativity theory for the apparent vast speed of recession of distant nebulae were challenged by Dr. Heber D. Curtis, Director of the University of Michigan Observatory at Detroit, speaking before the American Astronomical Society at the Perkins Observatory of Ohio Wesleyan University. Dr. Curtis declared that one group of distant nebulae, in the constellation of Leo, which seems to be departing at the rate of

PSYCHIATRY

Patients Disclose Private Affairs Under Drug Influence

A PSYCHOLOGIST has discovered a means of "breaking the ice" which will make even the most reserved person anxious to discuss his private affairs. It is a small dose of sodium amyral, a derivative of barbituric acid related to the common drugs veronal and luminal, which has been used for years as an anesthetic. Dr. Erich Lindemann, of the Psychopathic Hospital of the State University of Iowa, has reported its new use.

In the psychological laboratory of the Psychopathic Hospital, Dr. Lindemann performed the experiment of giving a very small dose of this same drug to psychotic patients in the hospital and also to normal individuals. This dose,

6,900 miles a second, is really going at the more modest figure of 1,500 miles. Further, he stated, by applying this correction, the nebulae are found to be not all receding from the earth, but some are approaching.

The measure of apparent motions of these nebulae is based on studies of their spectra, where the dark lines are shifted to the red end. Dr. Curtis called attention to a formula proposed thirty years ago by a French physicist named Moessard, and which has since been neglected. This takes into account the motion of the observer, so by applying it to the motion of our own stellar system, the galaxy, these nebulae, which are distant galaxies, are found to be moving at slower speeds.

If Dr. Curtis' contention is correct, previous explanations of these apparently high speeds on the basis of a limited universe are wrong, and our universe is really infinite. He objected not only to Einstein's view, and the application of it to the problem by Dr. Willem de Sitter, of Leiden, Holland, but he also questioned other explanations by Dr. C. F. Tolman, of the California Institute of Technology, and by the Belgian priest, the Abbé G. Lemaitre, that the universe really is expanding at tremendous rate.

Dr. Curtis admitted that his theory required certain assumptions but claimed that they were no more unreasonable than assumptions made by others.

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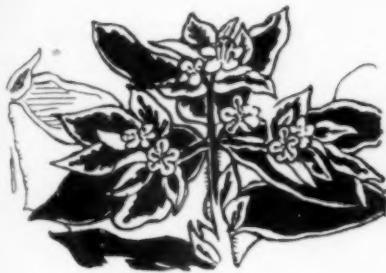
though too small to produce anesthesia or even sleepiness, had a decided effect on the emotions and on the subject's personal relations with those coming in contact with him.

The most striking effect on the normal subjects was the desire to tell about personal matters which the individual would ordinarily want to keep hidden. Under the influence of this drug, a person is unable to refuse to give the answers to questions about the most intimate matters. He shows a warm emotional attitude toward others, and has a feeling of strength, self-confidence, and serene contentment.

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SEISMOLOGY

BOTANY
Nature Ramblings
By FRANK THONE



Snow-on-the-Mountain

THE thinning autumn pasturelands of the West and the farther Midwest still show brave displays of taller plants that hold out against the frost and likewise are able to repel hungry livestock. Conspicuous by virtue of the sharp white stripes with which its foliage is adorned is that interesting euphorbia species known colloquially as snow-on-the-mountain. It is an attractive herb that gets to be as much as three or four feet high, and is favored to some extent as a cultivated plant in the East.

It is like its other relatives of the euphorbia genus in its predilection for gaudy leaves. The most familiar euphorbia to most of us is the poinsettia of the Christmas floral displays, whose flaming head is not really a flower but a collar of leaves surrounding a group of inconspicuous little flowers. Only our snow-on-the-mountain carries the decorated-leaf motif all the way down its stem.

It shows its kinship again by its milky juice. Most euphorbias bleed white when they are cut. A most important example is the Para rubber tree, whose latex really runs into big money.

When a succulent plant is left standing alone in a well-grazed pasture it is a pretty good sign that for some reason the cattle don't like its taste. Snow-on-the-mountain, again like most euphorbias, is very bitter, and would probably poison stock if they ate it. Another related plant, the common castor-bean, contains the deadliest vegetable poison known; and certain tropical euphorbia vines yield arrow poisons used by primitive tribes.

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Explosive Used to Produce Earth Tremors Artificially

YOSEMITE National Park was the scene recently of several earthquakes, the first artificial tremors of their kind produced for purely scientific purposes. They were engendered not by the slipping of rock layers along a fault line, as in real earthquakes, but by the explosion of charges of explosive.

The experiment was launched jointly by the Carnegie Institution of Washington, D. C., and the California Institute of Technology, Pasadena, Calif., under the direction of Dr. John P. Buwalda, chairman of the geology and paleontology division Dr. Beno Gutenberg, professor of geophysics and seismology at the Institute, and Henry Salvatori and assistants of Dallas, Texas.

Two methods of producing tremors were used. A tunnel, more than 2,300 feet long, was dug by the National Park Service into the cliff east of Bridal Veil Falls. In this tunnel, several hundred feet underground, several hundred pounds of dynamite were exploded twice daily. Vibrations set up by the explosives were registered on instruments, many miles distant from the source of the disturbance.

Smaller charges were exploded on the surface and the vibrations set up in the solid granite recorded with instruments placed some thousands of feet away.

Dr. Buwalda reported that the "Yosemite Valley is a deep, narrow and ver-

tical-walled chasm, and when vibrations were caused on one side, the surface waves which usually confuse the readings of seismograms were eliminated because they were reflected back when they struck the vertical cliffs on the side of the valley from which they radiated. A network of telephone lines made it possible to send precise time signals from the point of explosion to the recording point."

Three problems were studied. The first was to determine the velocities of earthquake waves in the several different kinds of granite. This was done by determining the exact thousandths of a second required for the vibrations to travel a measured distance through the granite.

The second problem was to determine the effect of a vertical-walled canyon or valley on earthquake waves when they travel approximately at right angles or across the valley. Each explosion, Dr. Buwalda said, set up three kinds of tremors and it was important to know which reached the other side of the canyon and which was eliminated by being reflected back by the canyon wall.

The third problem was to record the echo in the rock wave by reflection from the bottom of the granite itself.

The explosions were so slight that tourists in the park did not feel the tremors created.

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Orchids That Look Like Girls, Doves and Swans

From Page 183

But if you get to wandering through the spring woods there will be no end to the pictures that the flowers will show you. Where Jack-in-the-pulpit grows, not far away you will be sure to find clumps of Dutchman's breeches. And here the resemblance has no need for the easy faith of children to make it good; the grownuppest person in the world will admit without argument that it is washday in fairyland's Amsterdam.

And how many of us stop to think that the violin, the most nearly human thing that was ever carved out of responsive wood, got its name from the violet? The violin's elder sister, the alto

member of the family, is known as the viola; and *Viola* the violet has been in Italy, the home of the greatest violin-makers, ever since the days of Romulus and Remus.

There is another flower that gives children great delight whenever they get a chance to see it.

This flower is the little elephant, once known botanically as *Elephantella*. Its slender spire stands up a foot or so high, crowded with little pink elephant's heads sticking out toward all points of the compass, like decorations on a temple in the Javanese jungles.

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• First Glances at New Books

Linguistics

OUTLINE DICTIONARY OF MAYA GLYPHS—William Gates—*Johns Hopkins University Press*, 174 p., \$3.50. (Limited edition of 207 numbered copies.) This is the first systematic compilation of Maya glyphs. More than 2,500 distinct glyphs and about 100 minor modifying ones, all out of the three known Maya codices, are so arranged that each glyph is seen in all its contexts and combinations. Mr. Gates has definitely translated certain glyphs as a result of this systematic arrangement, the first time any such translation has been made. Maya writing is neither phonetic, pictographic, nor rebus, but ideographic, Mr. Gates says. It has a system, and the key is in the minor modifying glyphs. The glyph dictionary is a groundwork indispensable in future studies of Maya writing.

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Biography

THE GREAT PHYSICIAN—Edith Gittings Reid—*Oxford*, 299 p., \$3.50. The life of Sir William Osler is well told in this short book. It will appeal to those who have not had time to read Dr. Cushing's longer work on the same subject. For those who do not know about the great physician, it will prove a splendid introduction.

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Ichthyology

A HISTORY OF FISHES—J. R. Norman—*Stokes*, 463 p., \$7.50. A thorough-going biology of fishes, discussing their form and locomotion, their physiology, their relations to mankind. This book can be advantageously added to the reference shelf of any zoological laboratory, and of course will be especially useful to all persons concerned in any way with fishes.

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History

SKELETONS OF WORLD HISTORY, PART I—A. Johnstone Richardson—*The Red House, North Walsham, Norfolk, England*, 251 p., 50 c. To pack into a small paperbacked volume the main facts of world history from the beginnings of life down to 500 A. D. is a herculean task. Mr. Richardson has accomplished it by eliminating all but the fact words, even when that means at times leaving out verbs and other aids to easy reading. A chance quotation will best show the effect: "Egypt;

B.C. 1500, First Egyptian Empire; today a little communication node in British Empire; Eighteenth dynasty; Thothmes I and Thothmes III warred to Euphrates and the Orontes; subdued Phoenicia; took tribute from Assyria, Mitanni, Khatti; annexed Palestine and Syria."

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Philosophy

THE SCIENTIFIC OUTLOOK—Bertrand Russell—*Norton*, 277 p., \$3.00. In this book Russell returns to his earlier vein, this time as official cold-shower to some of the over-enthusiastic prophets of modern science. At the same time his faith in science itself is undimmed. He discusses the nature of scientific knowledge, scientific technique and the society based on science. "Science has more and more substituted power-knowledge for love-knowledge" is his characteristic conclusion. "The government of the world," he says, "by which I do not mean its ministerial posts but its key positions of power, has been allowed to fall into the hands of men ignorant of the past, without tenderness to what is traditional, without understanding of what they are destroying." Russell still retains the art of giving his dicta the appearance of perhaps misleading clarity: but his pronouncements have the advantage of coming from a broad context.

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Bibliography

A CATALOGUE OF BRITISH SCIENTIFIC AND TECHNICAL BOOKS: Third Edition—Compiled by Daphne Shaw—*A. and F. Denny*, 754 p., 20 s. The British Science Guild retains the world in its debtors' ship with this new edition of the complete and well classified bibliography of British publications in science. Each entry gives author, title and publisher; size, date and price. Useful supplements are the list of publishers and the extensive name index.

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Astronomy

SIDEREAL EXPLORATIONS—Harlow Shapley—*Harvard Reprint* 68, 115 p. A brief but comprehensive summary of the grand program of celestial exploration now in progress at Harvard College Observatory in Cambridge and at its southern observatory, formerly in South America, now in South Africa.

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Entomology

THE INSECT MENACE—L. O. Howard—*Century*, 347 p., \$3.50. The former field marshal of the forces holding the American front against the devouring hexapod hordes, just retired with honors after a lifetime of battle, here presents in the vivid dramatic style of which he is master a popular summary of the vast knowledge of the nature and disposition of the enemy that made him so valuable an officer in the army of defence. He knows which insects will attack, and when, and where; he knows the artillery that man can push up to hold the line; he knows what allies mankind has in the camp of the enemy and how their aid can best be exploited. The illustrations, both drawings and photographs that are as clear and sharp as drawings, are quite worthy of Dr. Howard's text.

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Physics

THE UNIVERSE IN THE LIGHT OF MODERN PHYSICS—Max Planck—*Norton*, 114 p., \$2.00. In the midst of the present flood of explanations of what modern physics is doing to upset the world, it is of value to have a statement from the man who, along with Einstein, really started all the hullabaloo—Max Planck, the founder of the quantum theory. Instead of trying to dazzle the uninitiated with verbal firecrackers Planck soberly outlines the nature and salient results of recent physical thinking as it appears to him. His method of exposition may make his book heavy for a generation accustomed to scientific popularization, but it is correspondingly less likely to mislead.

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General Science

THE AMERICAN MUSEUM AND THE UNIVERSITY—*City of New York*, 208 p. The sixty-second annual report of the trustees of the American Museum of Natural History gives, in addition to the usual fiscal facts and figures, some carefully-thought discussion to the special problems facing a great museum in a metropolis.

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Physics

A MANUAL OF EXPERIMENTS AND PROJECTS IN PHYSICS—H. Clyde Krennerick—*Heath*, 184 p., 84c. Intended for use in modern high school courses.

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